2001-04 STARTING & CHARGING SYSTEMS

Generators & Regulators - 163 Chassis

IDENTIFICATION

WARNING: **Vehicles are equipped with air bag supplemental restraint system. Before attempting any repairs involving steering column, instrument panel or related components, see SERVICE PRECAUTIONS (or AIR BAG SAFETY PRECAUTIONS) and DISABLING & ACTIVATING AIR BAG SYSTEM in appropriate AIR BAG RESTRAINT SYSTEMS article.**

NOTE: When the battery is disconnected, vehicle computer and memory system may lose data. Driveability problems may exist until computer systems have completed a relearn cycle.

CHASSIS & ENGINE IDENTIFICATION

Model (Year)	Chassis	Engine
ML55 AMG (2001-03)	163.174	113.981
ML320 (2001-02)	163.154	112.942
ML350 (2003-04)	163.157	112.970
ML430 (2001)	163.172	113.942
ML500 (2002-04)	163.175	113.965

DESCRIPTION

Bosch generators are available in various amp ratings depending on engine application. Voltage regulators are transistorized and internal to generator. See **GENERATOR APPLICATION** table.

GENERATOR APPLICATION

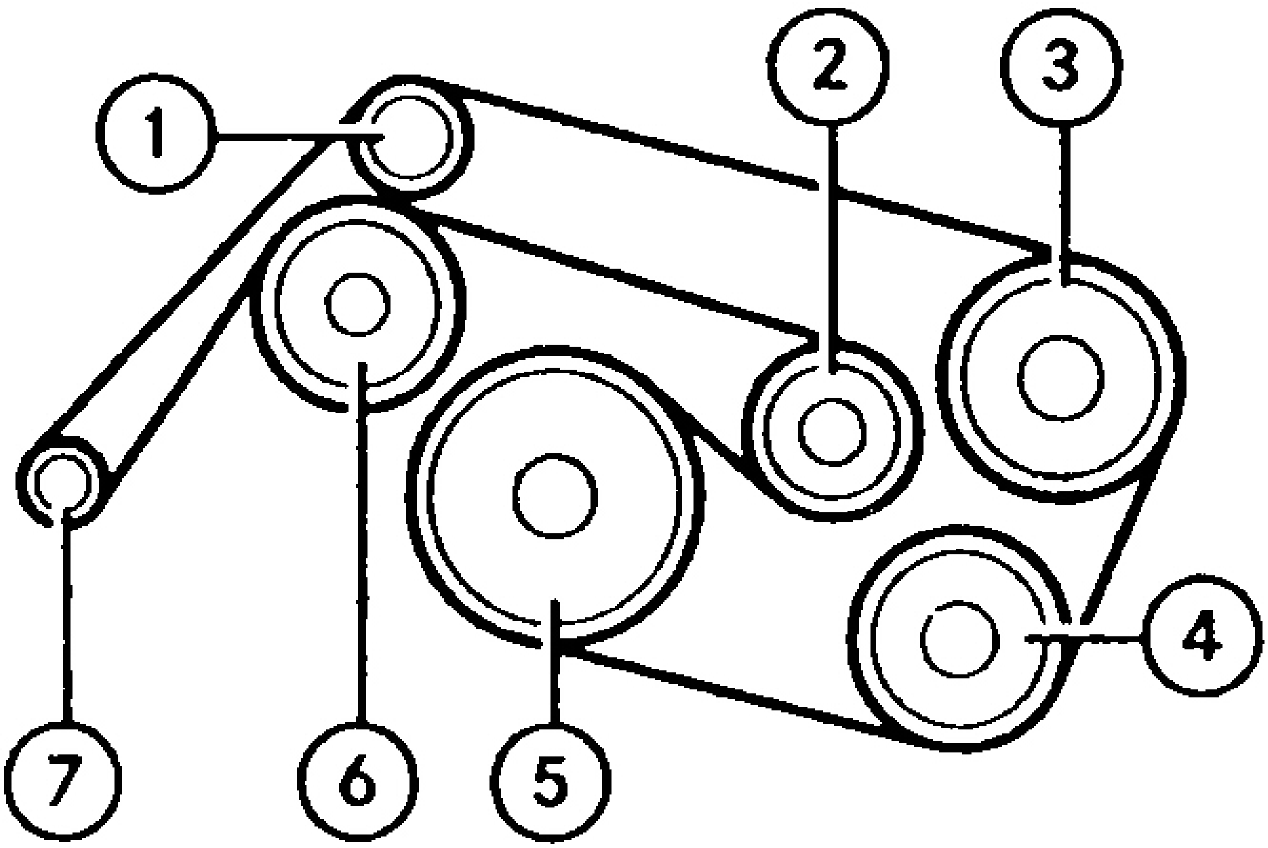
Application	Amp Rating
V6	115
V8	150

ADJUSTMENTS

NOTE: Vehicles have automatic belt tensioners. No adjustment is necessary.

DRIVE BELT ROUTING

For drive belt routing, see **Fig. 1** .



1. Idler Pulley
2. Automatic Belt Tensioner
3. Power Steering Pump
4. Air Conditioner Compressor
5. Crankshaft
6. Coolant Pump, Fan
7. Generator (Alternator)

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Fig. 1: Drive Belt Routing
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

TROUBLE SHOOTING

PRELIMINARY INSPECTION

Verify customer complaint by operating system. Visually inspect for obvious signs of mechanical and electrical damage. Check generator belt tension and condition. Ensure that battery voltage is within specifications. Inspect for blown fuses and damaged relays.

Verify ground connection integrity between engine, body, battery and generator. Check for damaged wiring harnesses and/or switches. Check for a broken or partially broken wire inside insulation, which could cause system malfunction but prove good in a continuity/voltage check with system disconnected. Ensure any aftermarket electronic equipment is properly installed. If fault is found, repair as necessary. If no fault is found, check for conditions that might cause an intermittent situation.

SERVICE PRECAUTIONS

BATTERY DISCONNECT/CONNECT

Disconnect Procedures

NOTE: Numbers and letters in text refer to numbers and letters in figures.

1. On vehicles not equipped with TELE AID, go to step 5 . Vehicles equipped with TELE AID, switch TELE AID into service mode by turning ignition ON.
2. Turn ON telephone and enter code "*#4610#" on handset.
3. Confirm that "No Telematics Service" appears on handset with okay.
4. Turn OFF handset.
5. Turn OFF ignition.
6. Open hood and open snap fasteners (1) on dust filter housing. See **Fig. 2** .
7. Remove dust filter housing (2) exposing battery.
8. If not using quiescent current retention unit, go to step 14 . If using quiescent current retention unit, go to next step.
9. Connect quiescent current retention unit by switching on quiescent current retention unit (7) and then first connecting positive terminal (8) and negative terminal (9) of retention unit to positive cable and battery ground (W10). See **Fig. 3** .
10. On vehicles equipped with TELE AID, remove luggage compartment cargo anchoring lugs and remove floor paneling.
11. Remove screws (1). See **Fig. 4** .
12. Dismantle cover from TELE AID control module (A35/8).
13. Disconnect connection coupling for back up battery and remove back up battery.
14. Disconnect negative battery cable (1) and insulate terminal. See **Fig. 5** .

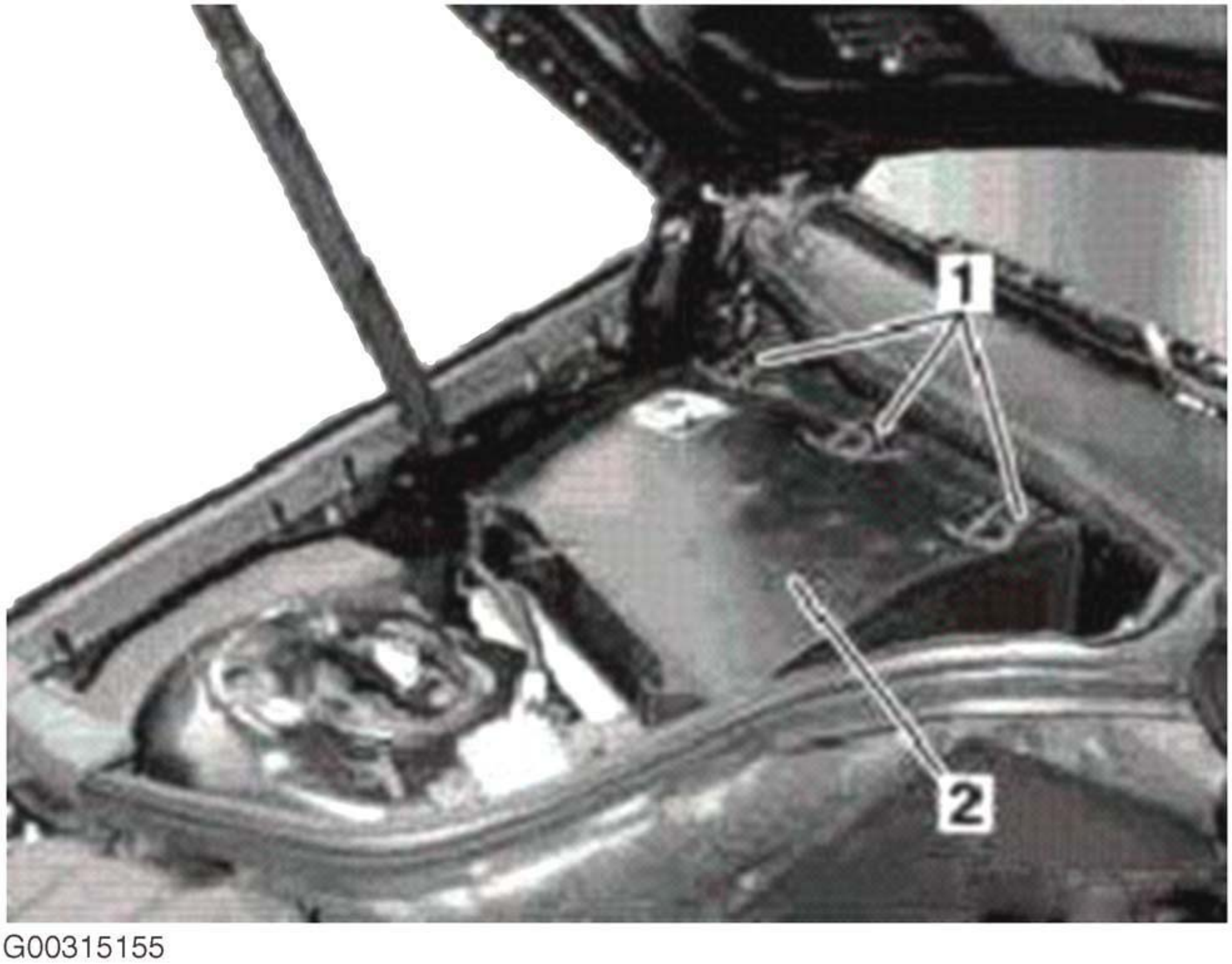


Fig. 2: Removing Dust Filter Housing
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

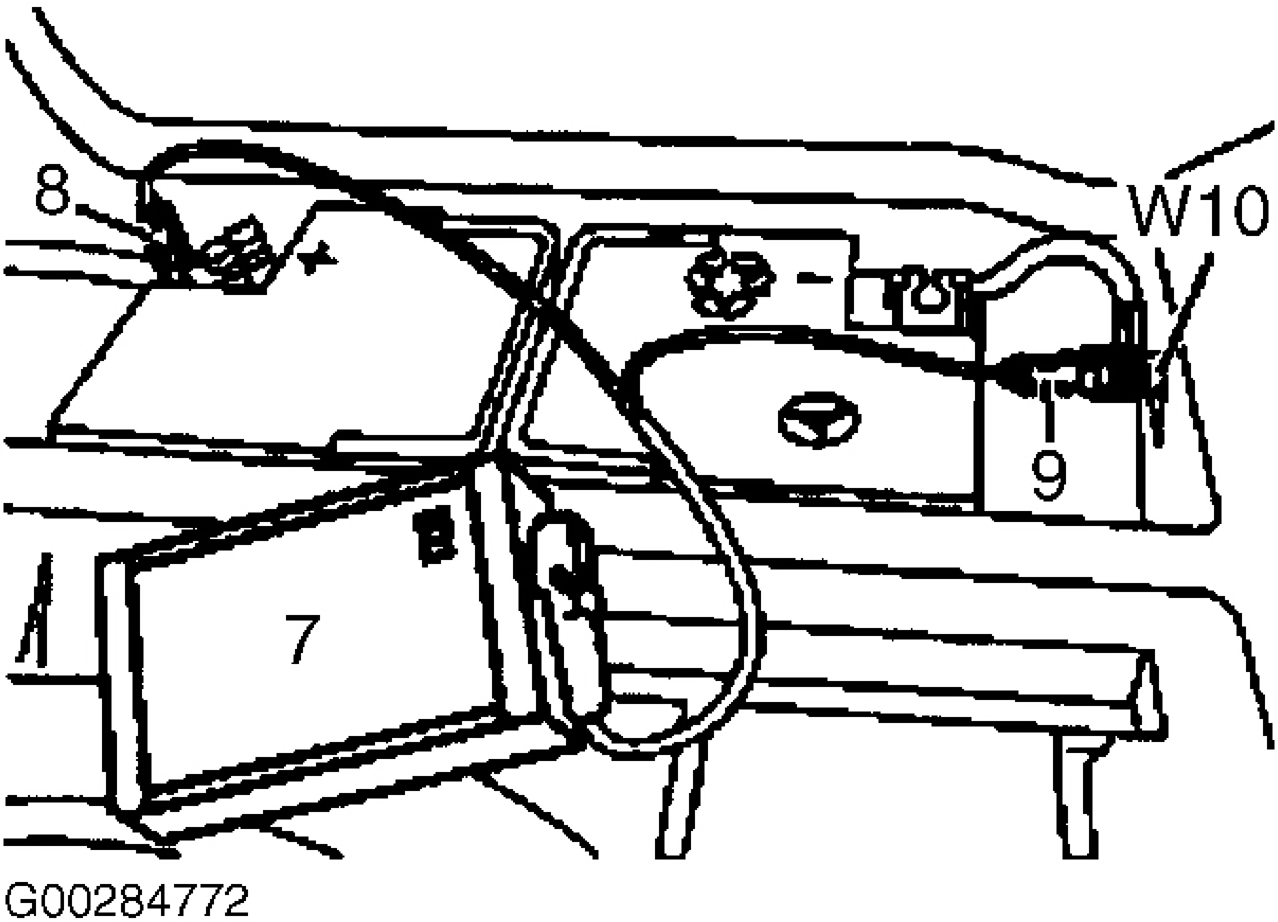


Fig. 3: Connecting Quiescent Current Retention Unit
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

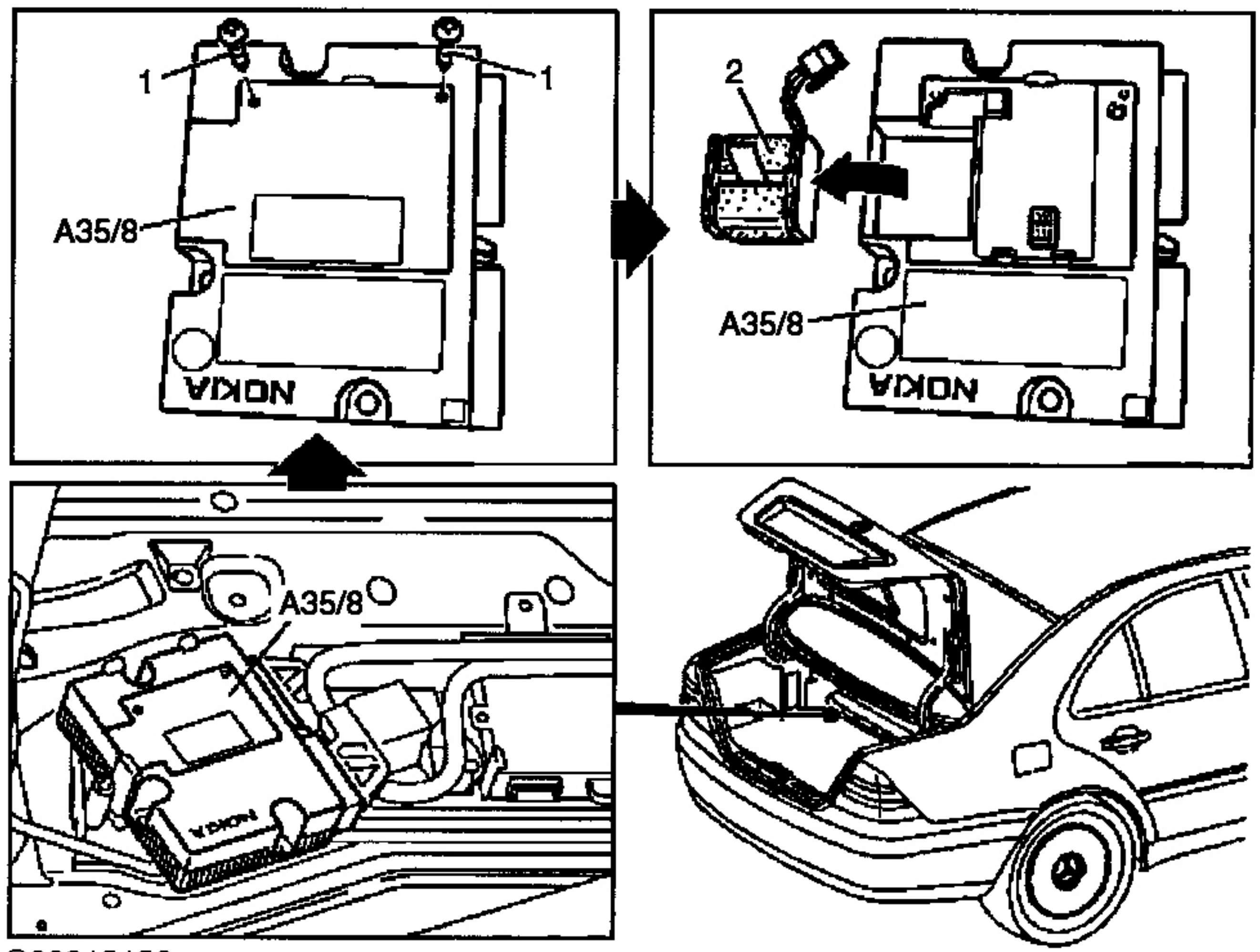
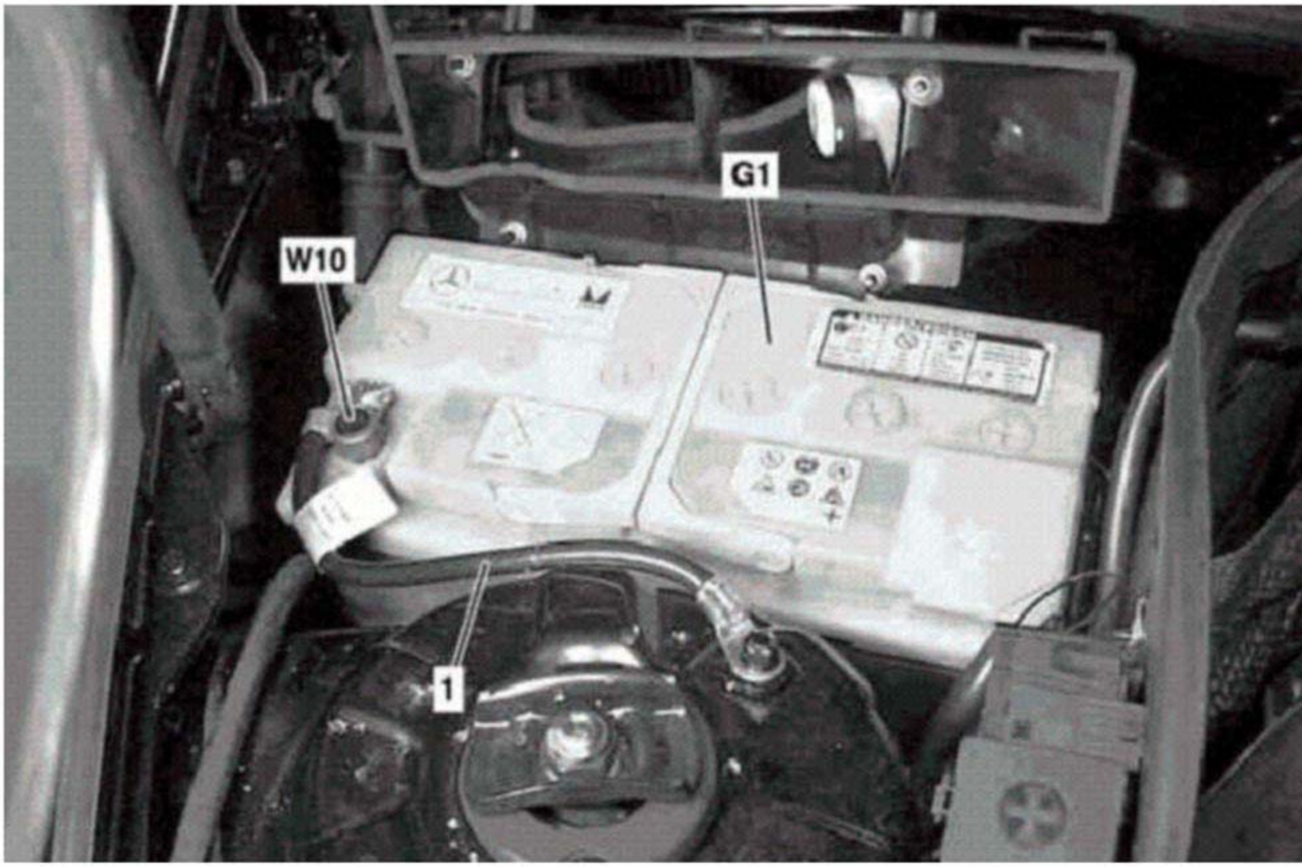


Fig. 4: Removing Emergency Call System Battery
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.



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Fig. 5: Disconnecting Ground Lead From Battery
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Connect Procedures

1. To install, reverse removal procedure. Install new back up battery for TELE AID. Switch OFF service mode in emergency call system by turning ignition on. Confirm "Leave Service Mode" with okay on handset and then confirm "No Telematic Service" with okay. If removed, tighten luggage compartment cargo anchoring lugs to 15 ft. lbs. (20 N.m).
2. If a quiescent current retention unit was not used, perform basic programming. See **BASIC PROGRAMMING** . After repairs using appropriate scan tool retrieve and erase any DTCs from memory. See **RETRIEVING & ERASING DIAGNOSTIC TROUBLE CODES** .

BASIC PROGRAMMING

1. Set time on instrument cluster. See **SETTING TIME** .
2. If equipped, set time on auxiliary or stationary heater.

3. Normalize side power windows. See **NORMALIZING POWER WINDOWS** .
4. Start engine and run at idle. Turn steering wheel from one lock position to the other to activate steering angle sensor. Center steering wheel. Message "EI. STAB. PROGRAM GO TO GARAGE" should erase from multifunction display panel.
5. If equipped, normalize tilting/sliding roof. See **NORMALIZING TILTING/SLIDING ROOF** .
6. If equipped, normalize memory power seats, steering column and outside mirror if components are installed. See **NORMALIZING MEMORY POWER SEATS, STEERING COLUMN & OUTSIDE MIRROR** .

Normalizing Power Windows

1. Completely close each window with manual switch. Hold switch in closed position for .3 second.
2. Repeat procedure for each power window.

Normalizing Memory Power Seats, Steering Column & Outside Mirror

1. Using manual switch, move seat to each end position and hold for .3 second. Repeat procedure for each switch except rear stop of backrest.
2. Repeat procedure for end positions of steering wheel and outside mirrors.

Normalizing Tilting/Sliding Roof

Open roof with SR switch until mechanical stop is reached. Continue to press switch for .5 seconds.

Setting Time

1. Use bottom left button on steering wheel to scroll through menus on instrument cluster to "Settings" menu.
2. Move selection marker with + or - button to "Time" submenu.
3. Press up or down arrows to "Clock, hours" setting. Confirm selection marker is on the hour setting.
4. Press + or - to set hour. Press reset knob in instrument cluster to confirm.
5. Move selection marker with + or - button to "Time" submenu.
6. Press up or down arrows to "Clock, minutes" setting. Confirm selection marker is on the minutes setting.
7. Press + or - to set minute. Press reset knob in instrument cluster to confirm.

TESTING

If generator malfunctions, check for Diagnostic Trouble Codes (DTCs) in Motor Electronics Sequential Fuel Injection (ME-SFI) system. See appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If cause of generator malfunction is not engine performance related, replace generator.

RETRIEVING & ERASING DIAGNOSTIC TROUBLE CODES

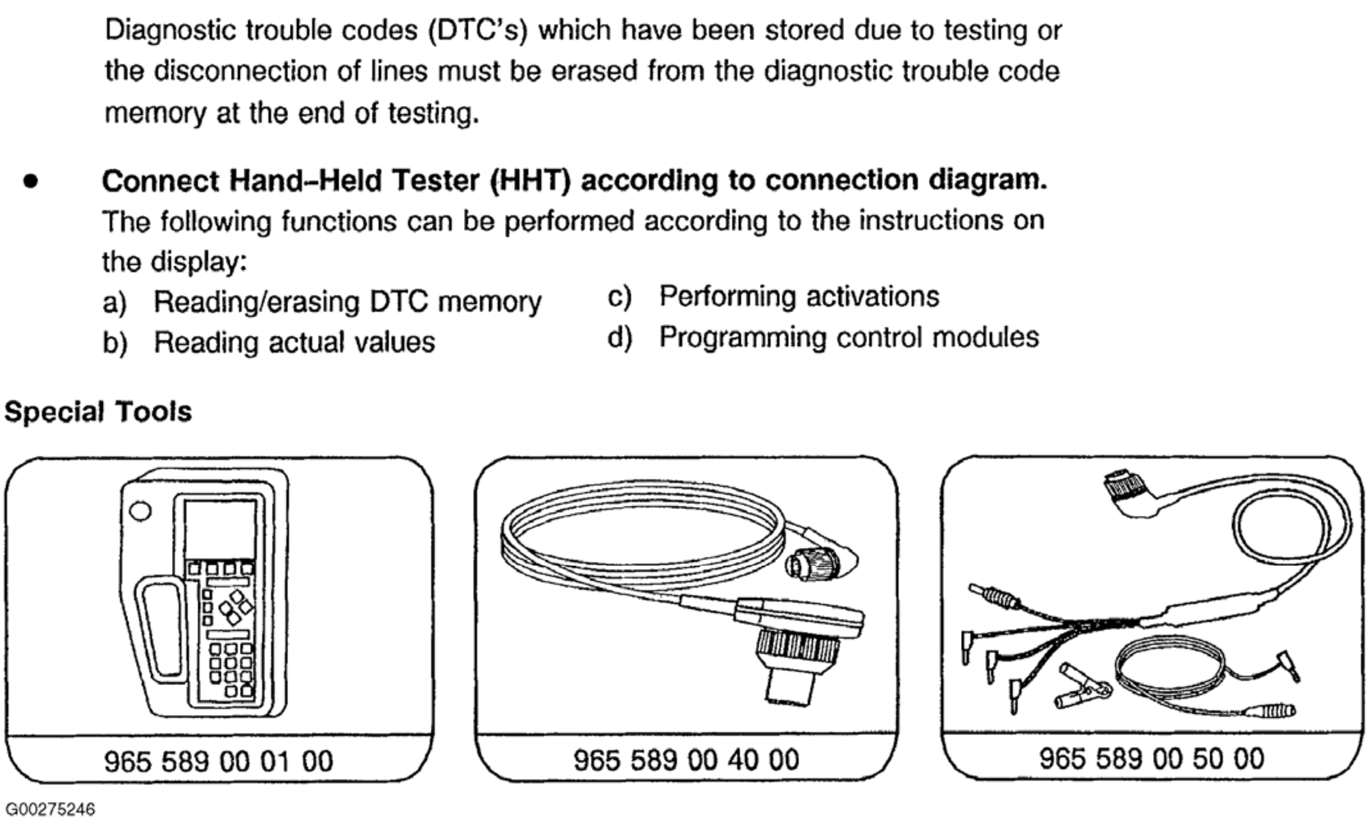
NOTE: **Before replacing any component that scan tool suggests are faulty, ensure that all wiring connections and harness connectors are okay. Ensure that power and**

ground circuits are functioning properly. For circuit identification, see appropriate WIRING DIAGRAM under ENGINE PERFORMANCE in SYSTEM WIRING DIAGRAMS for vehicle being tested.

RETRIEVING DIAGNOSTIC TROUBLE CODES

NOTE: **For diagnostic equipment connections, see <u>FAULT CODE DIAGNOSIS EQUIPMENT CONNECTION</u> .**

To retrieve codes using hand held tester, see **<u>Fig. 6</u>** .



<u>Fig. 6: Retrieving Codes Using Hand Held Tester</u>
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

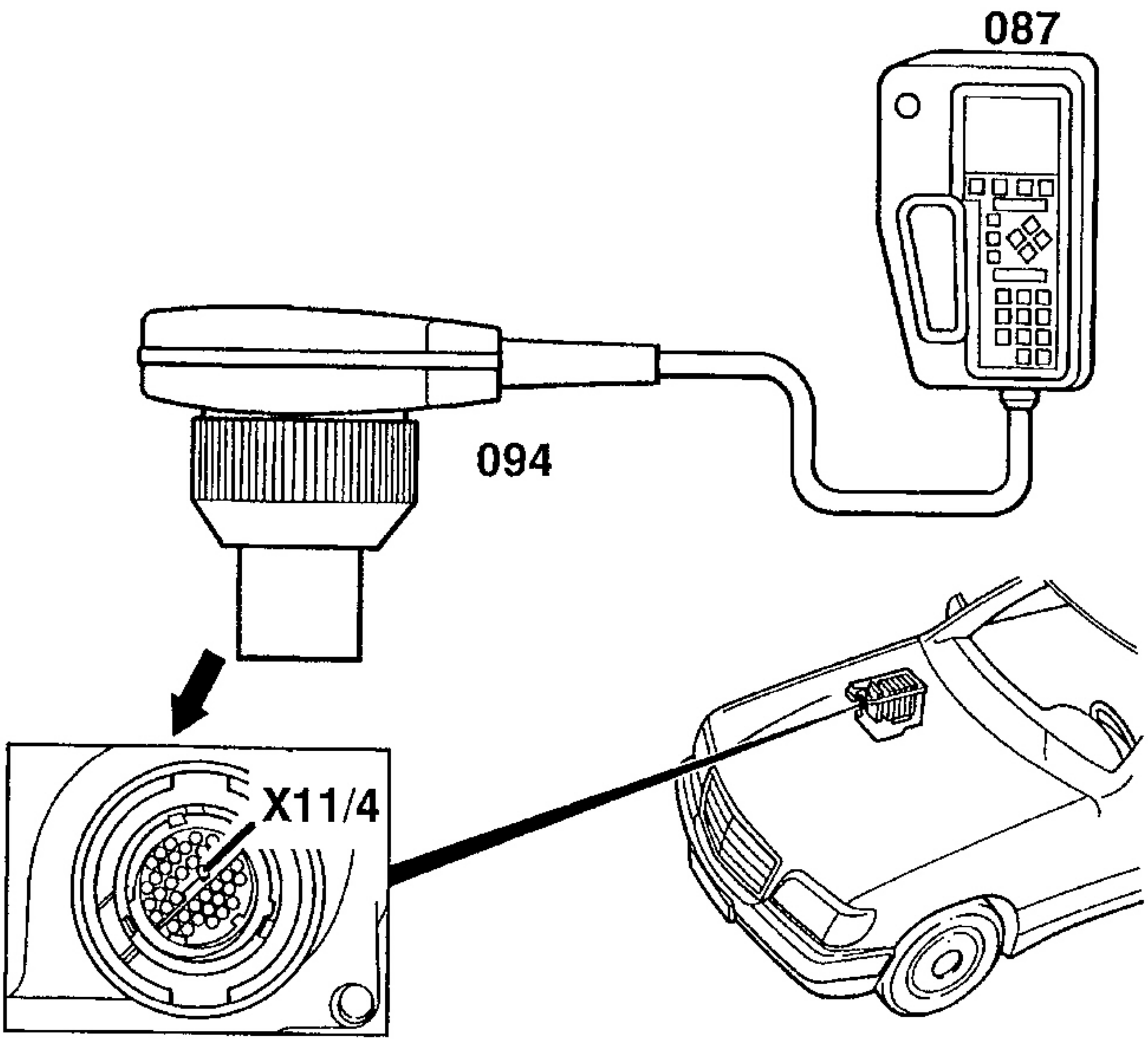
CLEARING DIAGNOSTIC TROUBLE CODES

Disconnecting vehicle battery will not erase codes. Follow scan tool equipment manufacturers instructions to erase fault codes.

FAULT CODE DIAGNOSIS EQUIPMENT CONNECTION

To connect hand held tester scan tool to Mercedes-Benz data link connector, see **Fig. 7** . To connect hand held

tester scan tool to OBD-II data link connector, see **Fig. 8** .

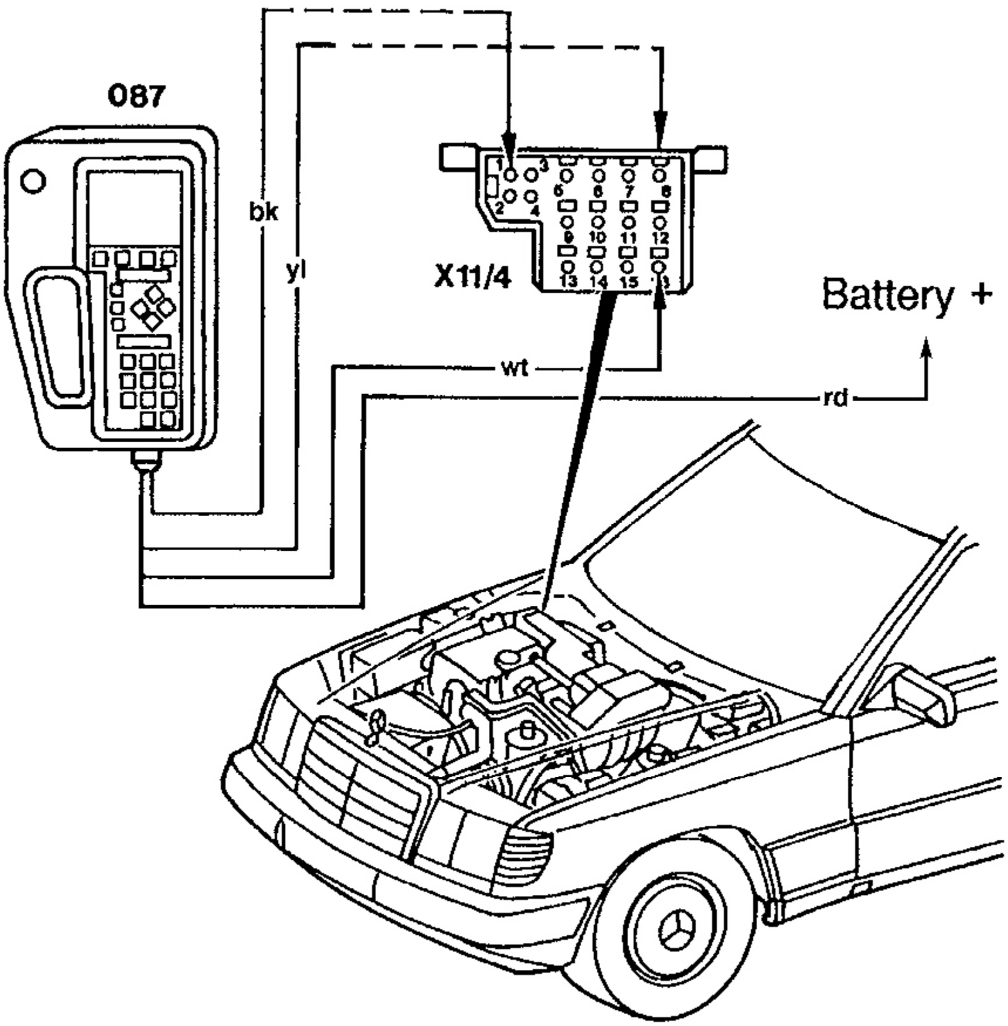


38-pole Data Link Connector (X11/4)

087 Hand–Held Tester (HHT)
094 Multiplexer, 965 589 00 40
X11/4 Data link connector

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Fig. 7: Connecting Hand Held Tester Scan Tool To Mercedes-Benz Data Link Connector
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.



16-pole Data Link Connector (X11/4)

Connect HHT as follows:

Black wire (circuit 31, ground):	socket 1
White wire (circuit 15, voltage):	socket 16
Red wire (circuit 30):	Battery +

Yellow wire to diagnostic output socket of the system being tested.

087	Hand–Held Tester (HHT)
X4/10	Terminal block, circuit 30
X11/4	Data link connector

Fig. 8: Connecting Hand Held Tester Scan Tool To OBD-II Data Link Connector
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

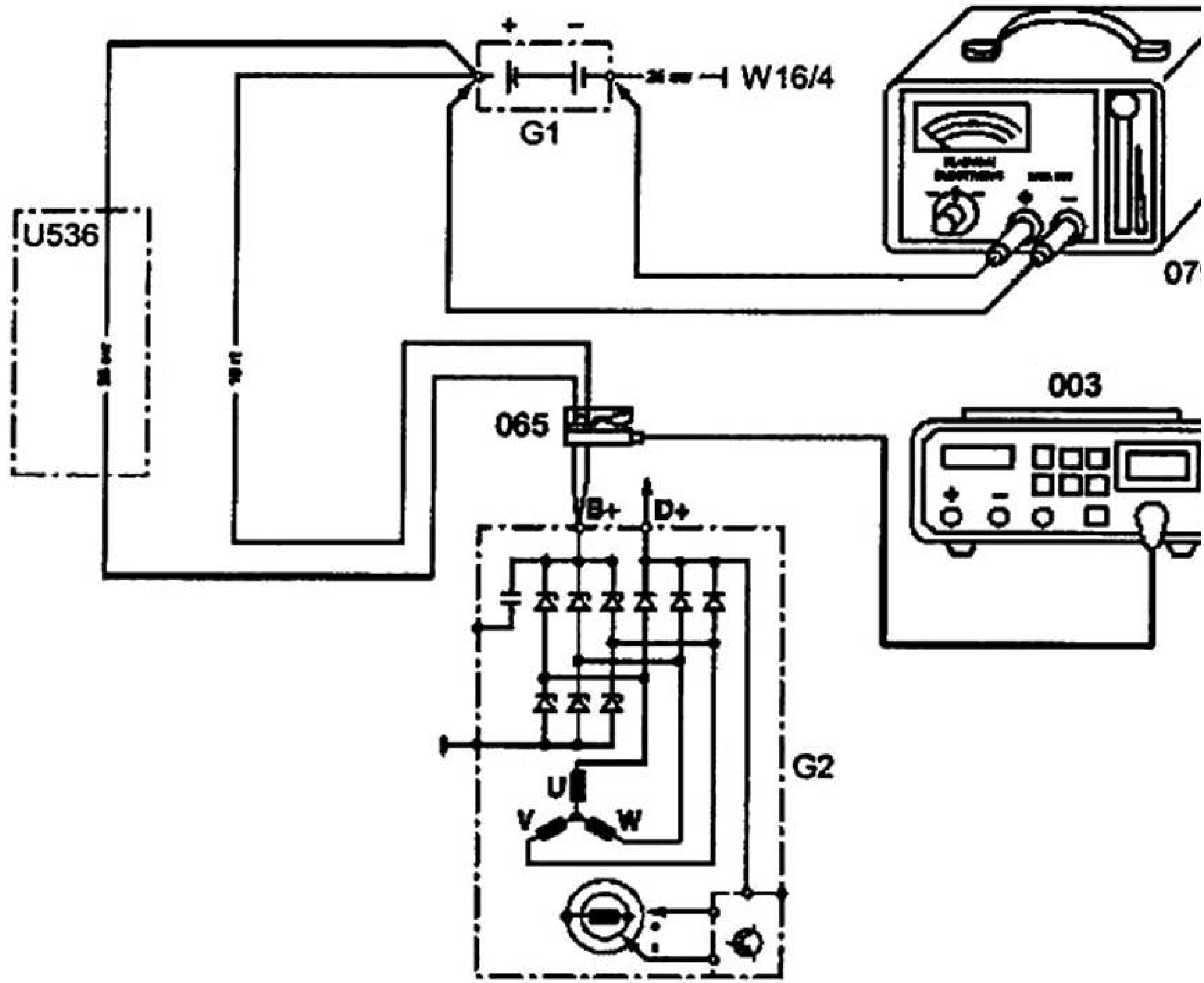
ON-VEHICLE TESTING

WIRING CONTINUITY

1. Connect voltmeter between generator B+ terminal and ground. Voltmeter should indicate battery voltage. If battery voltage is not indicated, check battery and check wiring between generator and battery for corrosion, loose terminals, etc.
2. Turn ignition on and ensure instrument cluster charge indicator light (battery symbol) comes on. If light does not come on, check wiring between generator and warning light, including indicator bulb.

GENERATOR OUTPUT

1. Ensure connections at battery and generator are clean and tight. Ensure generator, engine and body are properly grounded. Ensure generator drive belt is properly adjusted and in good condition.
2. Connect load tester/ammeter as per tester manufacturer's instructions. Connect voltmeter leads to battery terminals. See **Fig. 9** . Start engine and run at 2200 RPM for V6 or 2500 RPM for V8. Adjust load tester to obtain maximum generator output. DO NOT allow voltage to drop to less than 12.7 volts.
3. Maximum generator output should be within a few amps of generator rated output stamped on generator. If output is not within a few amps of generator rated output, check generator diodes. See **DIODE TEST** . Replace generator as necessary.



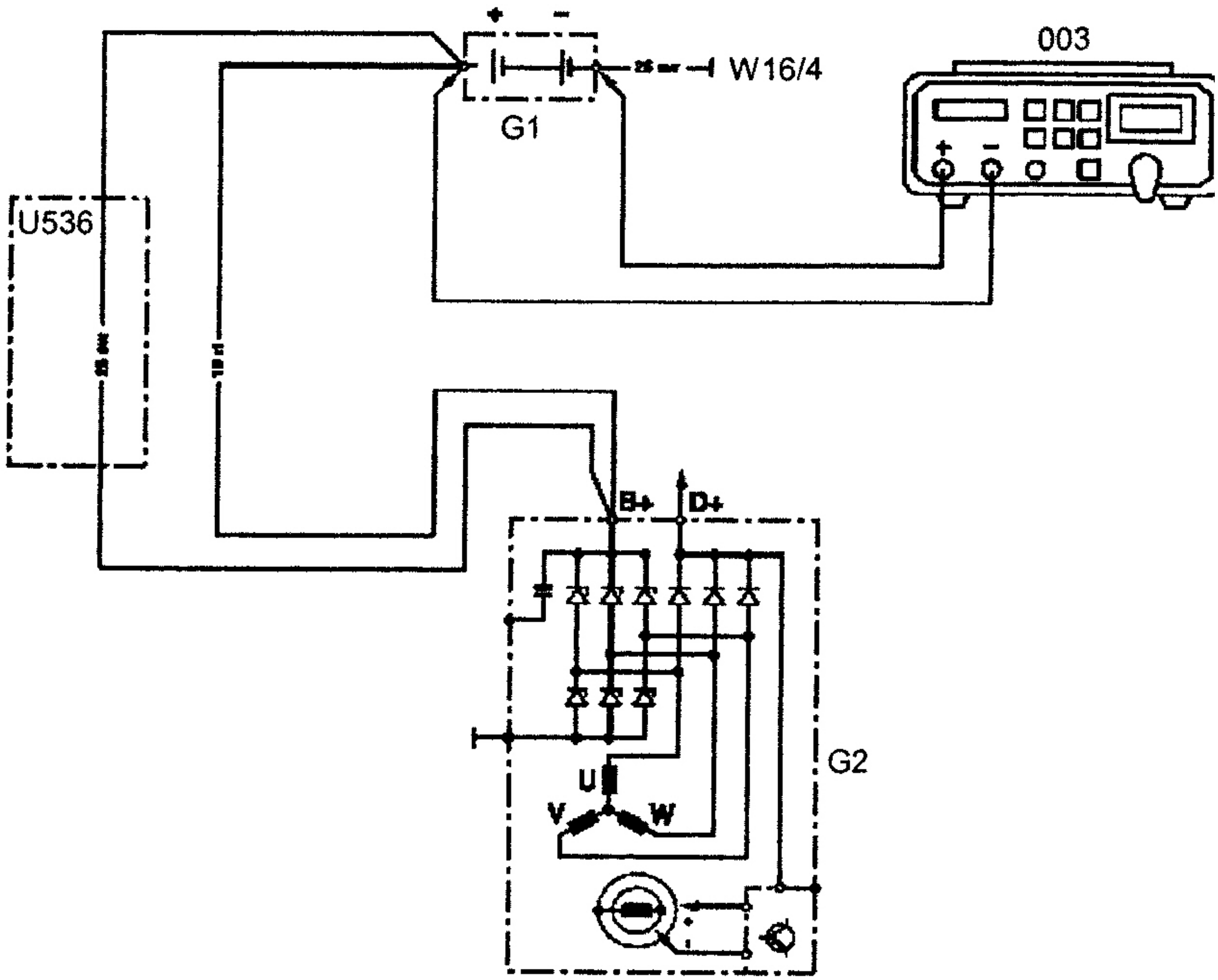
003	Multimeter	rt	Red
065	D.c. clamp	sw	Black
079	Volt-ampere tester with load resistor	U536	Valid for engines 112/113
G1	Battery	W16/4	Ground (output ground - major assemblies compartment - right)
G2	Generator		

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Fig. 9: Checking Generator Output (Chassis 163)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

VOLTAGE REGULATOR CONTROL

1. Connect multimeter. See **Fig. 10** . Ensure charge indicator light goes out when engine is idling and with increasing engine speed up to 3000 RPM. Apply load to battery by turning on headlights and noting reading after 2 minutes.
2. Voltage reading should be 13-14.5 volts. If voltage is not to specification, replace voltage regulator. See **VOLTAGE REGULATOR** under REMOVAL & INSTALLATION. If regulator is okay, replace generator. See **GENERATOR** under REMOVAL & INSTALLATION.



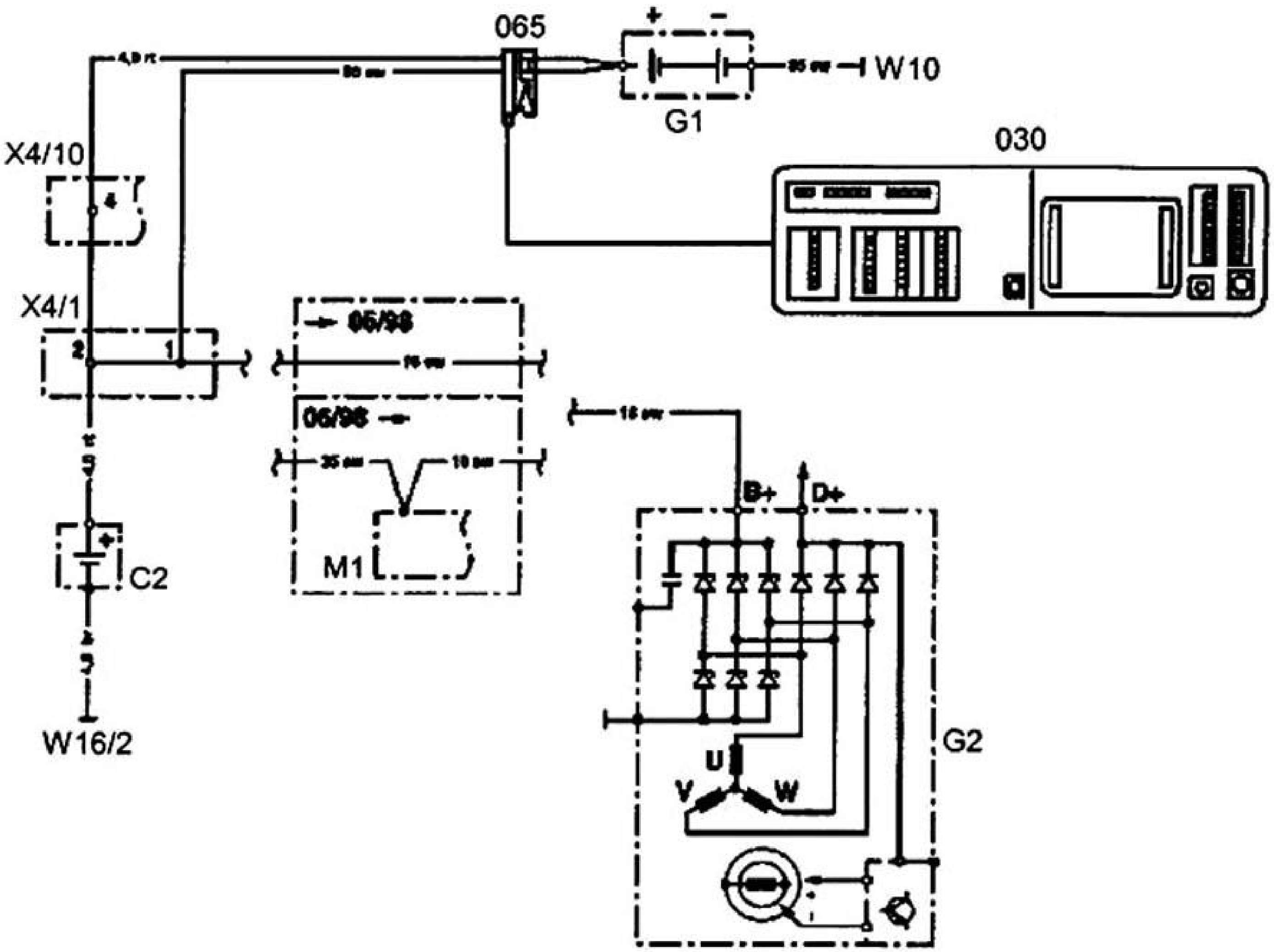
003	Multimeter	SW	black
G1	Battery	U536	Valid for engines 112/113
G2	Generator	W16/4	Common ground (ground major assemblies compartment right)
rt	red		

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Fig. 10: Checking Voltage Regulator (Chassis 163)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

DIODE TEST

Connect DC clip-on probe from engine tester with oscilloscope to positive battery terminal. See **Fig. 11** . Start engine. Switch on low beam. Access diode test at 3000 RPM. See **Fig. 12** -**Fig. 14** . Replace generator as necessary.



030	Engine tester with oscilloscope	X4/1	Terminal block (circuit 30 , interior)
065	D.c. clamp	X4/10	Terminal block (circuit 30/30Ü/61e/ 87L) (6-pin)
C2	Electrolytic capacitor (alternator/ battery harness noise suppressor)	br	Brown
G1	Battery	rt	Red
G2	Generator	sw	Black
M1	Starter		
W10	Ground (battery)		
W16/2	Major assemblies compartment ground (electrolytic capacitor, noise suppression generator/battery line		

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Fig. 11: Identifying Oscilloscope Connection
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

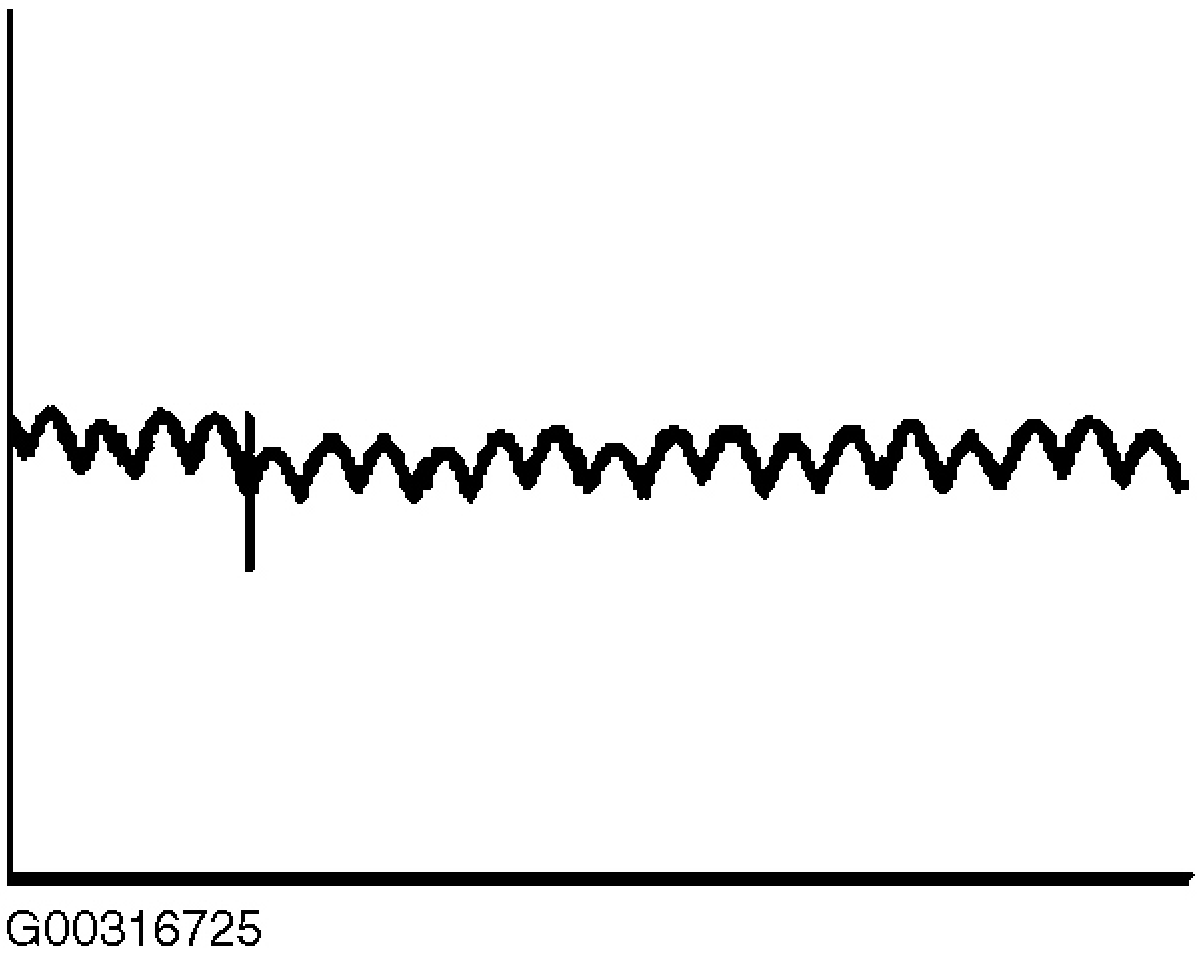


Fig. 12: Identifying Oscilloscope Patterns (No Fault Indicated)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

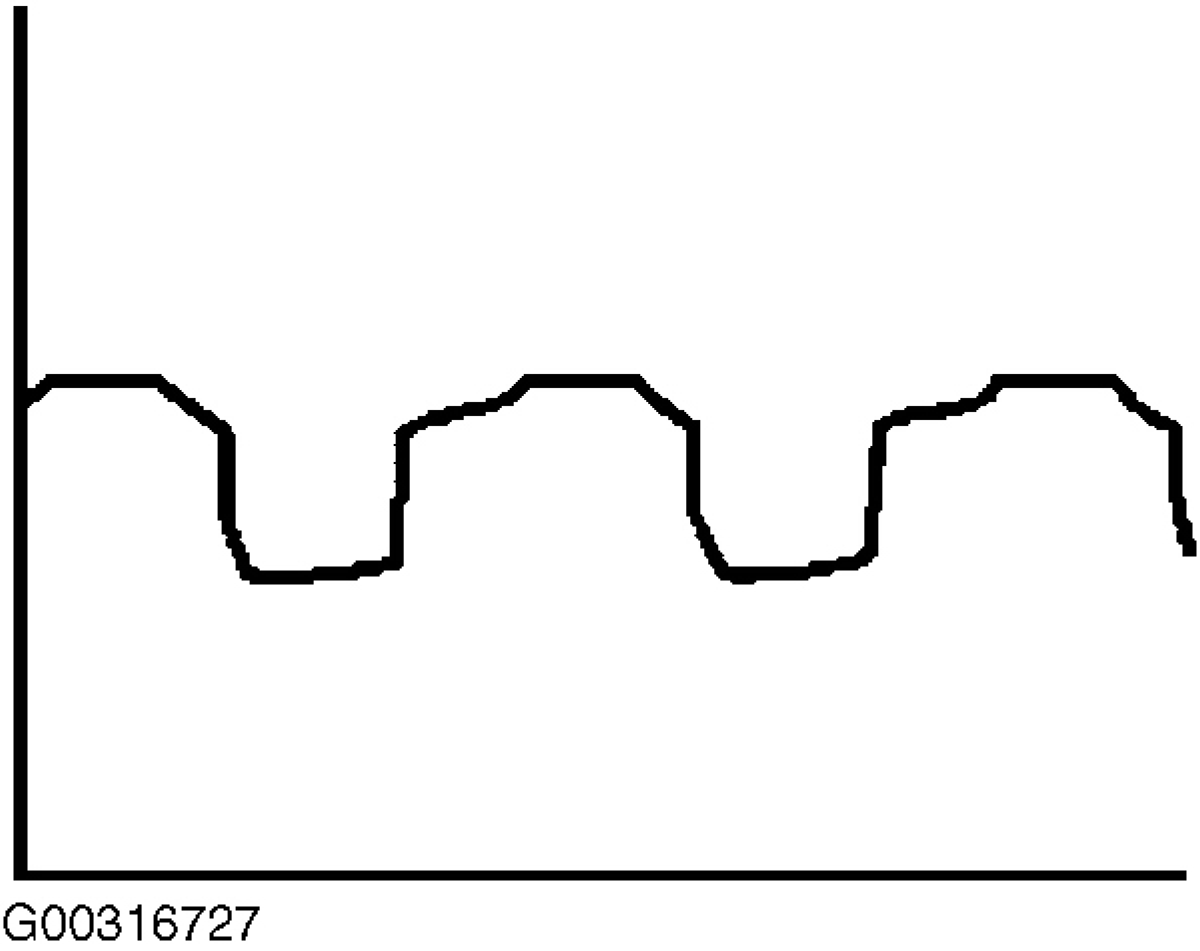


Fig. 13: Identifying Oscilloscope Patterns (Positive Diode Defective)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

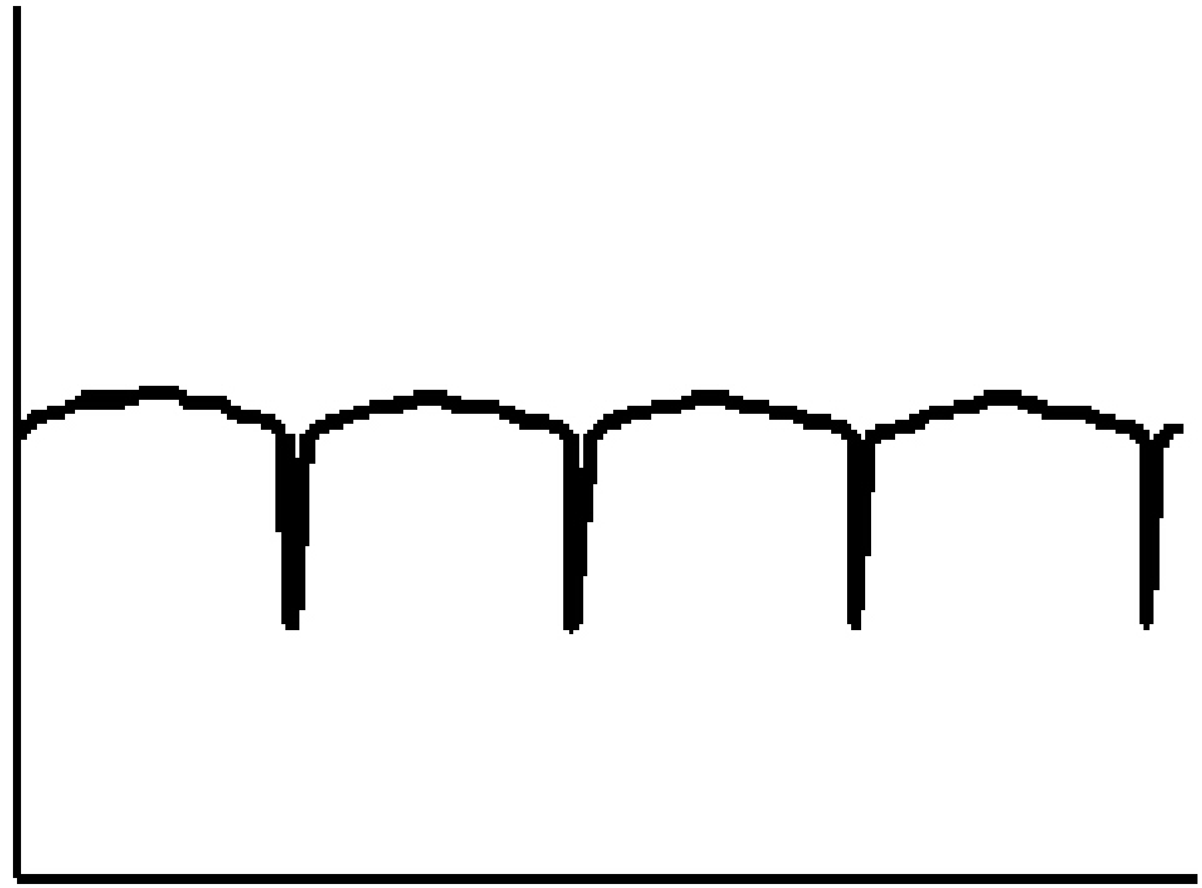


Fig. 14: Identifying Oscilloscope Patterns (Negative Diode Defective)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

REMOVAL & INSTALLATION

GENERATOR

NOTE: Numbers in text refer to numbers in figures.

Removal & Installation (Model 163)

Disconnect and shield negative battery cable. Remove air cleaner housing. Remove engine trim panel. Remove "V" belt by swiveling tensioning pulley and holding in place with a drift. Disconnect generator B+ electrical

connector (1) and electrical line circuit 61 (D+) (2). Remove 2 generator bolts (3). Remove generator. See **Fig. 15** . To install, reverse removal procedure. Using STAR scan tool, perform electrical operational check.

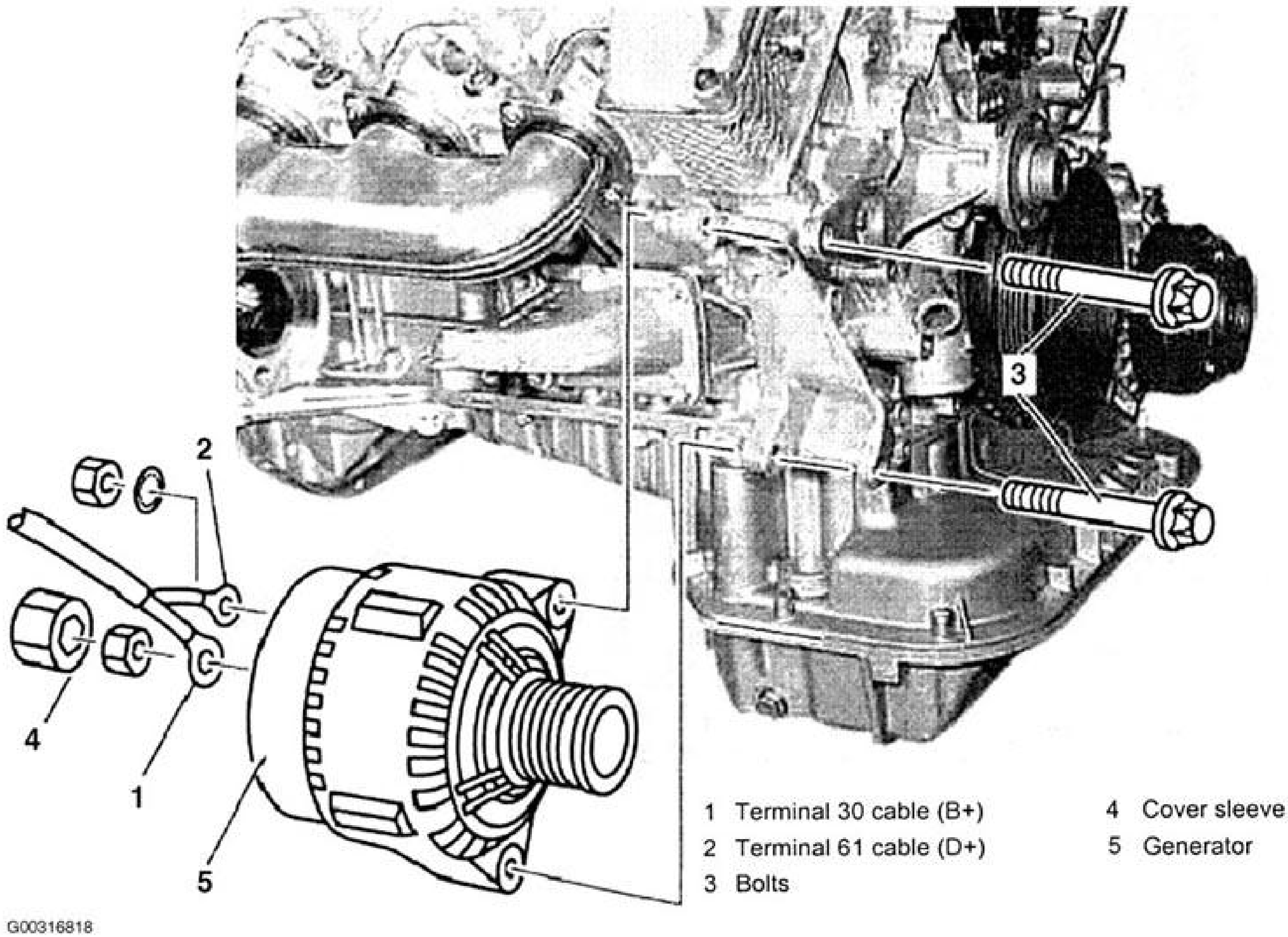


Fig. 15: Removing Generator
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

VOLTAGE REGULATOR

NOTE:	**Numbers in text refer to numbers in figures.**

Removal & Installation (Compact Generator)

Disconnect and shield negative battery cable. Remove generator from vehicle. See **GENERATOR** . Remove 3 screws (1). Unclip cover (2) by pushing apart retaining lugs (3) and remove. Remove 2 screws (4). Remove regulator (5) toward side. See **Fig. 16** . To install, reverse removal procedure. When inserting regulator (5), ensure ground lug (6) makes contact with regulator.

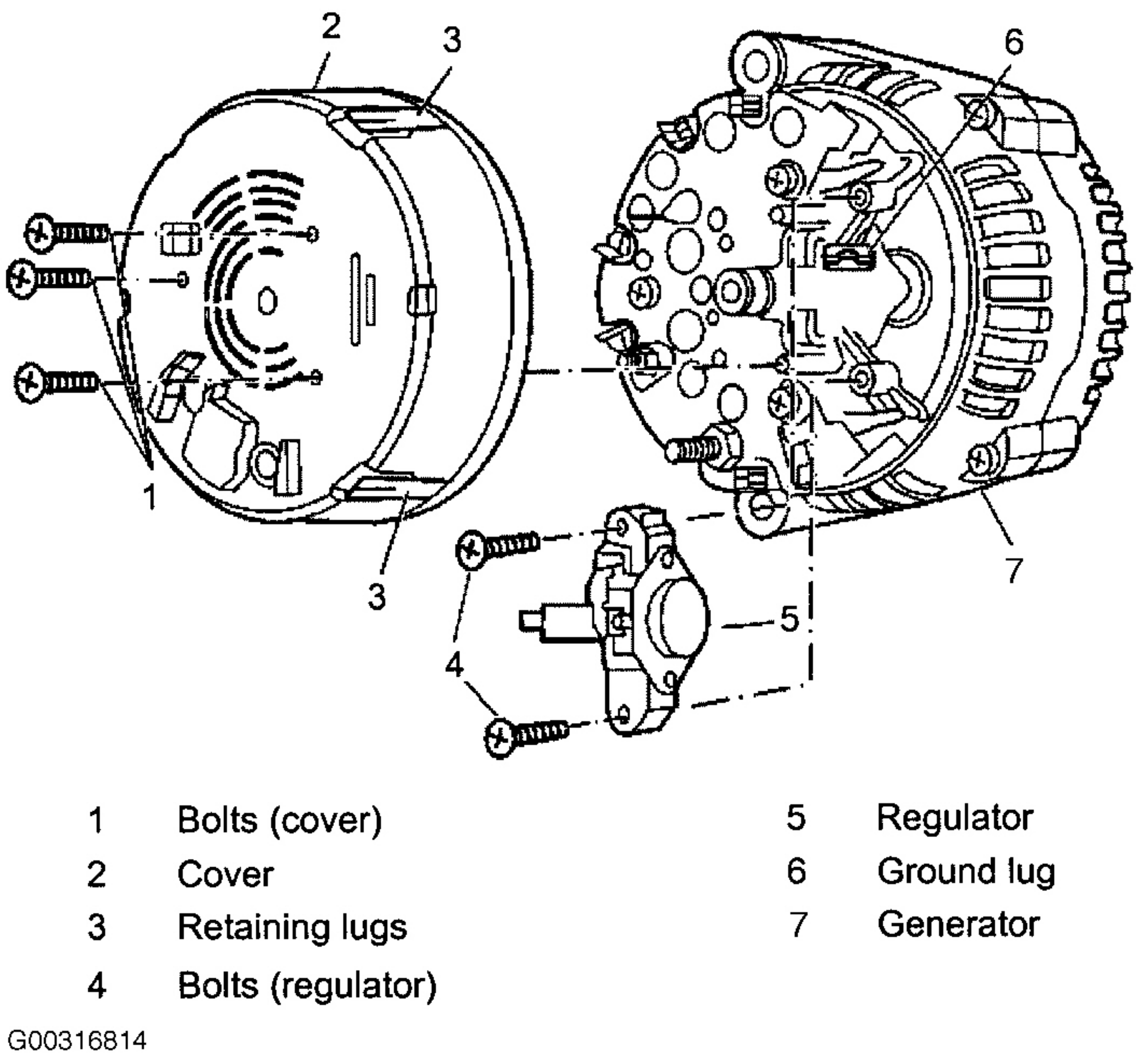


Fig. 16: Removing Voltage Regulator (Compact Generator)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Removal & Installation (Bowl-Type Generator)

Disconnect and shield negative battery cable. Remove generator from vehicle. See **GENERATOR** Remove 2 regulator screws from back of generator. Remove regulator. See **Fig. 17** .

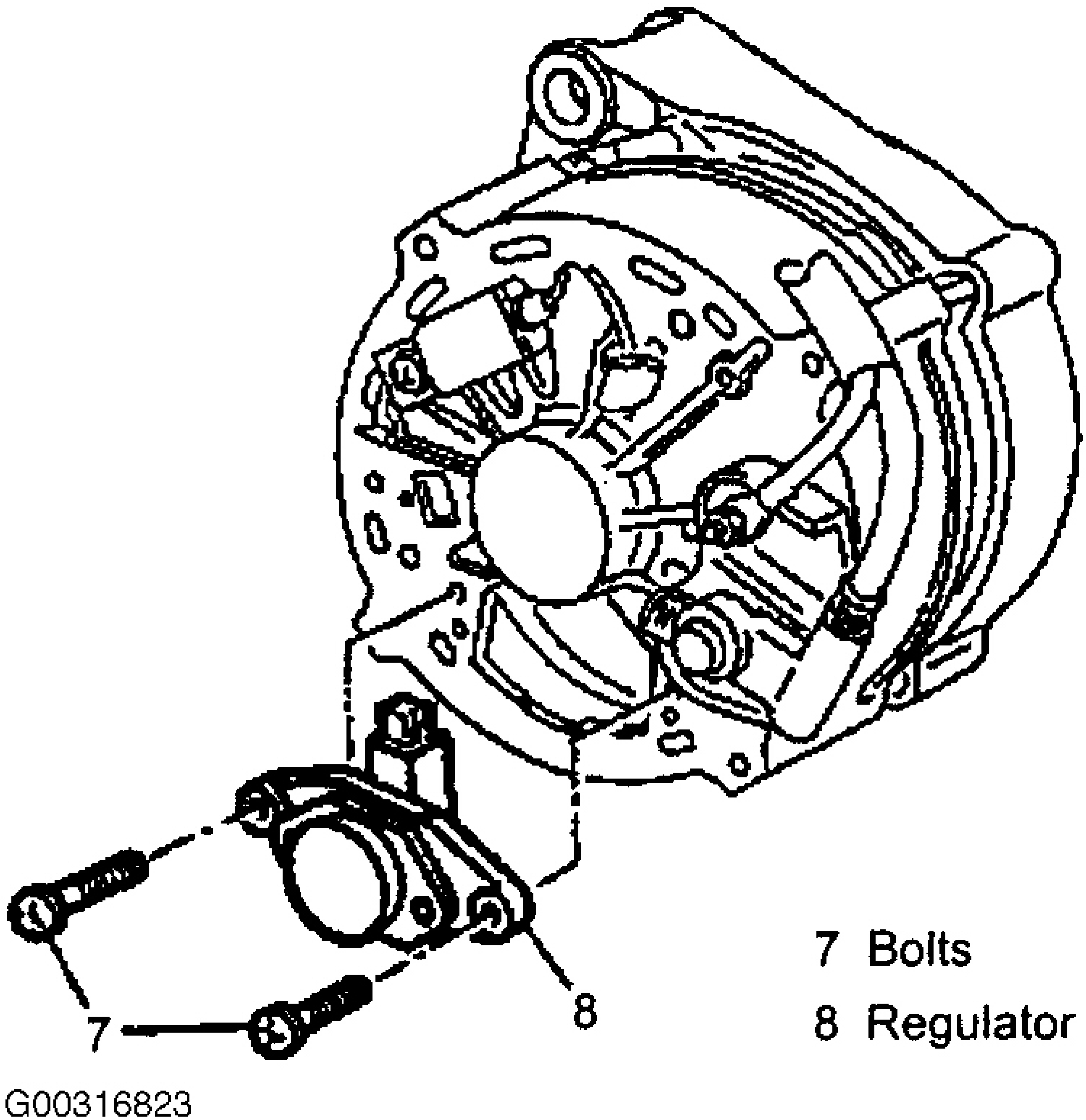


Fig. 17: Removing Voltage Regulator (Bowl-Type Generator)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Generator Mounting Bolts	30 (42)
Generator Pulley Nut	52 (70)

WIRING DIAGRAMS

See CHARGING SYSTEM in appropriate SYSTEM WIRING DIAGRAMS article in ELECTRICAL.